

In The Claims:

Claims 1-11 are pending.

Claims 3, 4, 6 and 11 are cancelled herein.

Claims 12-14 are newly added.

Claims 1, 2, 5, and 7-10 are amended herein.

The status of the claims is as follows:

1. (Currently Amended). A compact dual function ~~Random Number Generator (RNG) and Stream Cipher Generator (SCG) including~~ random number generator and stream cipher generator comprising:

a ~~Cryptocrypto-engine~~ operable as either a random number generator or a stream cipher generator, and

a controller ~~for controlling the Cryptocrypto-engine to operate either as a RNG or a SCG~~ the random number generator or the stream cipher generator, including three multiplexers controlled by the controller to supply signals selectively to and receive signals from the ~~Cryptocrypto-engine~~, in which a first multiplexer is arranged to receive ~~a random number generator RNG seed signals or SCG and a stream cipher generator key signals~~, a second multiplexer is arranged to receive a dynamic synchronization ~~parameter signals or~~ and a constant synchronization signals, and a third multiplexer is arranged to receive an output signals from the ~~Cryptocrypto-engine~~ and provide ~~Random Number a random number output signals or Stream Cipher a stream cipher output signals~~, respectively in each case.

2. (Currently Amended). A ~~The compact dual function Random Number Generator (RNG) and Stream Cipher Generator (SCG) according to~~ random number generator and stream cipher

generator of claim 1, further including an XOR gate arranged to receive the Stream Cipher stream cipher output signals from the third multiplexer and separate the stream cipher outputStream Cipher signals into plaintext or ciphertext, such that the output of the XOR gate is in ciphertext or plaintext, respectively.

3. (Cancelled).

4. (Cancelled).

5. (Currently Amended). ~~A compact~~The dual function generator Random Number Generator (RNG) and Stream Cipher Generator (SCG) according to of claim 412; in which the ~~clipped Hopfield-hopfield Neural-neural Network-network (CHNN) pairs comprises an input CHNN and a output CHNN and in which an Input-the input CHNN (ICHNN)-provides a nonlinear interaction with a-the dynamic or/constant synchronization signal Synchronization Parameter input and an-the output CHNN (OCHNN)-provides a nonlinear interaction with an adjacent input CHNN ICHNN-output.~~

6. (Cancelled).

7. (Currently Amended). ~~A compact~~The dual function generator Random Number Generator (RNG) and Stream Cipher Generator (SCG) according to of claim 3,12 in which the clipped hopfield neural networks includeing neurons in one of two states  $\{0,1\}$ ; Ssynaptic Wweights in one of three states  $\{-1,0,1\}$ ; and a non-linear Activation-sign Ffunction  $\{0,1\}$ .

8. (Currently Amended). ~~A compact~~The dual function generator Random Number Generator (RNG) and Stream Cipher Generator (SCG) according to of claim 3,12 in which an input to a n-neuroneach Cclipped Hhopfield Nneural Nnetwork pair is arranged to converge to one of the  $2n+1$  stable states or attractors of the network after finite steps of iterations k.

9. (Currently Amended). ~~A compact~~The dual function generator ~~Random Number Generator (RNG) and Stream Cipher Generator (SCG) according to~~of claim 3,12 in which the clipped ~~H~~hopfield ~~N~~neural ~~N~~network is constructed using cascaded ~~L~~lookup ~~T~~tables of different attractor and input pairs if n is small.

10. (Currently Amended). ~~A compact~~The dual function generator ~~Random Number Generator (RNG) and Stream Cipher Generator (SCG) according to~~of claim 9, in which the ~~Lookup~~lookup ~~Tables~~tables are associated with an initial ~~S~~synaptic ~~W~~weight ~~M~~matrix ~~and or a~~ random selected ~~P~~permutated ~~S~~synaptic ~~W~~weight Matrix ~~in other instants.~~

11. (Cancelled).

12. (Newly Added). A dual function generator comprising:

a crypto-engine operable as either a random number generator or a stream cipher generator, including a randomizer and a non-linear manipulator in series, the randomizer having a plurality of clipped hopfield neural network pairs and the non-linear manipulator having at least one corresponding clipped hopfield neural network, and

a controller controlling the crypto-engine to operate either as the random number generator or the stream cipher generator, including three multiplexers controlled by the controller to supply signals selectively to and receive signals from the crypto-engine, in which a first multiplexer is arranged to receive a random number generator seed signal and a stream cipher generator key signal, a second multiplexer is arranged to receive a dynamic synchronization signal and a constant synchronization signal, and a third multiplexer is arranged to receive an

output signal from the crypto-engine and provide a random number output or a stream cipher output, respectively in each case.

13. (Newly Added). The dual function generator of claim 12 including a decision box for selecting whether the dual function generator is operating as a random number generator or a stream cipher generator and an attractor mapping table connected to the decision box for providing encrypted/decrypted data when the dual function generator is operating as a stream cipher generator.

14. (Newly Added). The dual function generator of claim 7 in which the neurons states are 0 and 1; the synaptic weights states are -1, 0, and 1; and the non-linear sign function is 0, and 1.